

Appendix D. Inventory projects identified by the San Francisco Bay Area Network for which funds are not available from the NPS Inventory and Monitoring Program at this time. These projects are not in priority order.

Determine Distribution and Abundance of Twenty-five High Priority Non-Native Invasive Plant Taxa – GOGA, PORE

Justification: The spread of non-native plants represents a significant threat to the biological diversity of PORE and GOGA. Both parks support a rich and diverse flora, containing more than 75 vegetation plant community types. One or more of the twenty-one most invasive exotic pest plant species occur within approximately 85 percent of these plant communities. Research on these invasive plants within the parks illustrates their ability to alter community composition and reduce the diversity of native plants, insects, and small mammals. Invasive non-native species are also found within all nine Special Ecological Areas designated as the most biologically intact and diverse areas within GOGA and within habitat of the federally endangered mission blue and San Bruno elfin butterflies, Raven's manzanita, Presidio clarkia, San Francisco lessingia, as well as 12 other special status plants. Appendix D lists non-native plants occurring in the parks that are of the greatest concern to managers for which there is the least information. These 25 taxa will be the focus of survey efforts.

Estimated Cost: \$125,500

Complete Accuracy Assessment of Vegetation Map – PORE, GOGA

Justification: PORE and GOGA are currently conducting an accuracy assessment of an aerial photo based vegetation map. This proposed project includes additional field verification and data collection required to refine the Seashore's existing vegetation map. The mapping contractor (ESRI) and subcontractors (AIS and CDFG) recommended that accuracy assessment be conducted on 1,600 points within the mapped area. Due to budget constraints, field crews will only be able to visit about 1,200 of these points. Funding of this project would allow completion of the accuracy assessment.

Estimated Cost: \$46,000

Complete Wetland Inventory - PORE

Justification: PORE's wetland resources face immediate and significant threats associated with land use both within and outside of the Seashore. Significant threats include oil spills, failing septic systems, hazardous material spills, beef and dairy operations, visitor use, mariculture operations, Seashore facility development, and development on adjacent lands. The first step toward meeting this mandate is generating accurate information on the location, characteristics, and condition of the wetlands. This inventory and mapping effort will complete the data collection and management tasks required to effectively assess, prioritize, protect, and restore wetlands at PORE. In 2000 and 2001, enhanced wetland inventories will be conducted of the watersheds supporting Drake's Estero, Estero de Limantour, Tomales Bay, and Abbott's Lagoon. These inventories will verify and expand on NWI maps by mapping wetlands that NWI may have missed, documenting vegetation, and identifying existing potential threats. This proposed project will allow completion of the wetlands inventory park-wide.

Estimated Cost: \$71,000

Wetland Inventory - GOGA

Justification: Wetland and aquatic sites provide significant habitat for fish and wildlife (including sensitive wildlife species such as the California red-legged frog) and important hydrologic functions (e.g., protection of water quality). This study would complete an inventory of existing wetland and aquatic sites within the Golden Gate National Recreation Area to facilitate their protection. In addition, wetland sites with potential for restoration would be identified from field and map evidence of wetland habitat impacts (e.g., fill). Wetland and aquatic sites within GOGA would be mapped in accordance to the U.S. Fish and Wildlife Service's Cowardin classification system that focuses on the presence of either hydrophytic vegetation, hydric soils, or evidence of surface water. The project statement is a companion to Point Reyes National Seashore's Wetland Inventory and Mapping (PORE-N-59) which was funded for FY 2000-2001. The project would provide digital and hardcopy maps to outline existing wetlands and aquatic sites within the Park. The project would also include a database of wetland attributes (e.g., Cowardin classifications, wetland acreage by type, nature of threats, hydric soil class, dominant vegetation), identification of sites with potential for restoration, photographic documentation of typical Park wetland sites, and an enhanced vegetation map of the Park due to additional field accuracy assessment.

Estimated Cost: \$45,500

Inventory Aquatic Vascular Plants - PORE

Justification: Based on the best professional judgement of agency botanists and local botanical experts, PORE's inventory of terrestrial vascular plants is over 90% complete. It is highly likely, however, that the aquatic vascular plants have not received the level of survey intensity as have the terrestrial plants. A systematic sampling of aquatic plants is required to ensure the park's vascular plant inventory is complete. A minimum of 30% of all aquatic sites will be visited. A stratified random sampling system would be used to determine the sites to be sampled to ensure all types are represented adequately in the sample.

Estimated Cost: \$10,500

Lichen Inventory – PINN

Justification: Rocky areas of Pinnacles provide ideal habitat for lichens. Preliminary surveys were conducted in the mid-1980's, but information indicates that only a small portion of the flora was documented. Encroachment of urban areas to the north will likely impact lichens at PINN due to their sensitivity to air pollution. PINN has an air quality station that monitors the changes in air quality continuously. In conjunction with this information, a correlation between changes in air quality and changes in lichen species can be made over time. Without baseline information on which species are present at PINN it will be difficult to determine the effects of urbanization and changes in air quality on the lichen population. Due to the difficulty in lichen identification, a contractor would be used to systematically sample PINN and produce a list of all species present in the area. Emphasis would be placed in the rocky areas of PINN where the majority of the species are expected.

Estimated Cost: \$25,000

Mapping and Characterization of Bishop Pine, Riparian, Coastal Bluff and Oak Woodland Plant Communities – PORE, GOGA

Justification: PORE and GOGA support numerous rare and sensitive native plant communities including oak woodland, coastal bluff, riparian forest and scrub, and northern Bishop pine forest. In addition to being rare in and of themselves, these plant communities often provide habitat for rare plant and animal species. A critical component of the park's vegetation management program involves protecting and ensuring the long-term health of these ecosystems. Threats to these communities include nonnative plant encroachment, historic land use (e.g., past and present effects of cattle grazing such as changes in water quality and/or quality, and erosion), and alterations in fire regimes. Current vegetation mapping projects have provided preliminary information on some of these rare and sensitive plant communities, but map scales are too coarse to identify small patches of these habitats. Without a detailed, long-term management strategy, based on solid environmental data, these plant communities could be further degraded or eliminated. This proposed project addresses the following key high priority upland plant communities, with a brief rationale for their inclusion.

<u>Plant Community</u>	<u>Location</u>	<u>Rationale</u>
Bishop Pine Forest	PORE	Community is limited in distribution; trees potentially susceptible to pitch canker (<i>Fusarium circinatum</i>).
Coastal Bluff	PORE and GOGA	Community is very limited in distribution, largely due to conversion of California coastal plant communities; supports numerous rare plants (e.g., Point Reyes rein orchid).
Oak Woodland	PORE and GOGA	Black oak, tanoak, and coast live oak are currently being killed by fungus (<i>Phytophthora</i> sp.); data on distribution and infected areas required to manage plant communities and fuels.
Riparian Forest and Scrub	PORE and GOGA	Extent of these communities statewide has diminished dramatically; many remaining riparian habitat adversely affected by past land use and in need of restoration.

Estimated Cost: \$125,000

Vegetation Map - PINN

Justification: New lands were added to PINN in January of 2000 which have no vegetation classification data associated with them. Additionally, the existing vegetation map for PINN was produced 20 years ago. Since that time, numerous wildfires have occurred and recovery from previous wildfires has occurred, making the existing map significantly inaccurate in many places. Baseline data on vegetation types is needed to help focus systematic sampling for other inventory and monitoring studies, both plant and animal.

Estimated Cost: \$80,000

Inventory of Invasive Non-native Plants - PINN

Justification: Control of non-native plants at Pinnacles is a priority in order to protect native species from habitat loss and displacement by invasive non-natives. Preliminary inventories are needed to document the extent of invasive non-native species populations and facilitate the removal process. Currently there are 7 species that are of immediate concern at PINN. By focusing efforts in sensitive habitats or in areas that help prevent the spread of these invasive species, control efforts can be more effective. Without these initial inventories the control of these species will not be effective.

Estimated Cost: \$26,000

Rare and Endangered Plant Inventory - PINN

Justification: There are twelve rare and one endangered plants that occur at Pinnacles National Monument. These species are located in various habitats throughout the Monument where populations may be threatened by encroachment of exotic plant species. Additionally, the lack of knowledge on species distribution makes management of visitor activities difficult, since the relationship of these activities to the populations is unknown. Documentation on the distribution and abundance of these species will aid in management and protection of these species from further impacts.

Estimated Cost: \$32,000

Inventory Ashy Storm-petrels – GOGA, PORE

Justification: Ashy Storm-petrels have a very limited world distribution and are so imperiled that it may be listed in the near future under the federal Endangered Species Act. Much of the suitable breeding habitat within GOGA and PORE remains unsurveyed. Ashy Storm-petrels are known to breed in only three places in the world – the Farallon Islands, the Channel Islands, and at Point Reyes. Ashy Storm-petrels have been identified breeding at two locations at PORE, the northern most breeding area for the species. Suitable breeding habitat within GOGA and PORE, particularly sea caves within GOGA in the vicinity of the Golden Gate, is extremely vulnerable to human recreational use and disturbance. This project would determine the presence/absence, relative abundance, and distribution of Ashy Storm-petrels within these coastal parks. Inventory methods would target breeding birds only as this work is technically highly challenging given the inaccessibility of breeding habitat. One visit would be conducted to all suitable cliff, cave, and offshore rock and crevice habitat within the parks. Visual and olfactory surveys for presence/evidence of Ashy Storm-petrels would be conducted in August and September, after most other seabird breeding activity has peaked. Ashy Storm-petrel breeding season peaks in June or July and extends into October. Technical climbing, caving and zodiac operation within the surf zone would be required.

Estimated Cost: \$25,000

California Freshwater Shrimp Survey - PORE

Justification: The federally listed, endangered, California freshwater shrimp (*Syncaris pacifica* Holmes 1895) is endemic to perennial streams in Marin, Napa and Sonoma counties, California, and is the only extant species in the genus *Syncaris*. There are 16 coastal streams with extant shrimp populations. The shrimp is found in low elevation (<116 meters), low gradient (generally <1 percent), perennial freshwater streams where banks are structurally diverse with undercut banks, exposed roots, overhanging woody debris, or overhanging vegetation. Existing populations are threatened by introduced fish, deterioration or loss of habitat resulting from water diversion, impoundments, livestock and dairy activities, agricultural activities and developments, flood control activities, gravel mining, timber harvesting, migration barriers, and water pollution. No surveys have been conducted in potentially suitable habitat in lower Bear Valley Creek/Olema Marsh and in all of the freshwater, upper reaches of Drake's and Limantour Esteros. Inventories would be conducted using standard survey techniques (aquatic dipnets) approved by the U.S. Fish and Wildlife Service and by personnel with valid Section 10 (endangered species act) permits.

Estimated Cost: \$8,000

Bats Inventory (natural habitat) – PORE, GOGA, PINN

Justification: The objective of this project is to determine presence/absence, species diversity, and distribution of bats in remote areas of the parks, where bats are least vulnerable to human impacts. Bat inventory techniques are highly specialized and inventories for other mammalian species do not adequately inventory for bats. MUWO, natural habitats within the Presidio and Marin Headlands military fortifications at GOGA have already been surveyed for bats. Survey all potential bat habitat, looking for evidence of bats either by direct indicators such as bat presence or indirect indicators such as guano or staining. Conduct mist netting, and acoustic surveys using acoustic bat detectors and spotlights during winter, spring, summer and fall, approximately 8 nights per year for two years in foraging habitat (e.g. near water sources). Automated acoustic monitoring stations may also be installed in a variety of habitats and locations to collect additional data that may provide insights into future monitoring techniques. Additionally, design a sampling plan to install guano traps in tree hollows in forested habitats.

Estimated Cost: \$120,000

Inventory of Native and Non-native Freshwater Bivalves – PORE, GOGA

Justification: High densities of the Asian clam have been implicated in the decline of native unionid mussels. At least one native mussel, the California floater (*Anodonta californiensis*), is still present within lower Lagunitas Creek. The California floater, a former U.S. Fish and Wildlife Service Category 2 species, is considered a species of concern. Survey efforts are urgently needed to determine the extent of native and introduced bivalves and the habitat conditions that may influence the distribution of the two species. Systematic instream surveys would be conducted to determine the species composition and abundance of native and introduced bivalves in depositional areas of lower Lagunitas, Olema, Redwood Creeks and freshwater/brackish regions of PORE Esteros. Survey activities will consist of either timed visual surveys or use of clam rakes along belt transects across the creeks. Biological surveys will be preceded by physical habitat surveys to document the location of depositional areas to place upstream and downstream limits for survey activities. Survey data will determine the extent of the introduced Asian clam (*Corbicula fluminea*) which is known to be present in at least the Lagunitas Creek drainage.

Estimated Cost: \$8,000

Cave Invertebrate Inventory – PINN

Justification: PINN was created specifically for the scenic and scientific value of the rocks and caves. An important and over-looked resource within the cave environment is invertebrate species. Given the unique climate and conditions of cave, specialized invertebrate species occupy these habitats. Therefore, several endemic, potentially rare, and previously undescribed species are expected to be found within the caves at PINN.

Estimated Cost: \$7,000

Dune Invertebrate Inventory - PORE/GOGA

Justification: The California Coastal Dune habitat is rare and decreasing as exotic species alter the natural processes and compete with native plant communities. These sensitive communities have a higher degree of endemism in both plant and animal species than other communities in PORE or GOGA. Although several invertebrate species of concern occur in this dune habitat, no systematic surveys for invertebrates have been completed there. Previous research work has been on single species or the collection of invertebrates within a narrow taxonomic group. The project will create a species list with a limited distribution map and increase the collection of voucher specimens. Suggested methods include screening sand, pitfall traps, sweep netting and light trapping to collect specimens for identification.

Estimated Cost: \$7,000

Hymenoptera Inventory – JOMU

Justification: JOMU is primarily a cultural park. However, there is a relatively small natural area, Mt. Wanda, associated with John Muir's historic house and grounds. Due to the small size of the natural area (~ 320 acres), it is unlikely to be able to support viable populations of native vertebrates. However, it is large enough to support invertebrates. Because the surrounding landscape is essentially developed, urbanized land, it is expected that Mt. Wanda, with its primarily native vegetation, may be a refugia for native insects. Recognizing that it is impossible to fund an inventory of all invertebrate groups, inventorying hymenoptera (bees and wasps) is recommend because of their importance as pollinators. Hymenoptera may be important VITAL SIGNS for JOMU, primarily because of the small size of the natural area. Before long-term monitoring can begin, however, there must first be an initial inventory.

Estimated Cost: \$7,000
